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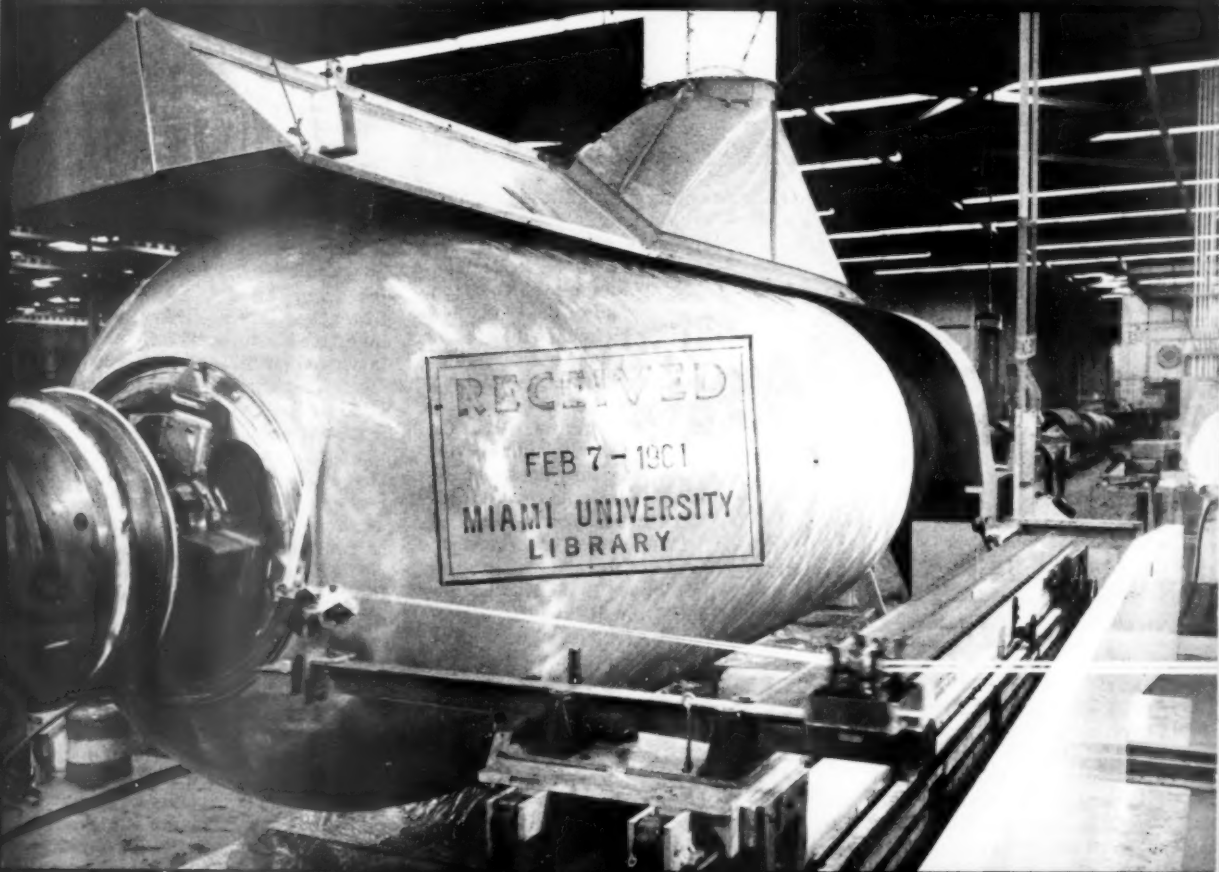
50 A YEAR

February 6, 1961

VOLUME 29, NO. 2 PAGES 65-74

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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Spun Glass Fuel Tank

Page 67

A SCIENCE SERVICE PUBLICATION

Kodak reports on:

an automatic camera with useful privileges... a mask for glass, switched by light... what Gutenberg might have done with photography

Reward thyself!

Though the *Kodak Retina Automatic III Camera* can be bought in the camera shops for less than \$130, it is not the cheapest camera they sell. We advertise it here in *Science News Letter* to show scorn for the notion that scientists must be poor or at least act poor. When a scientist goes out to buy a new camera for his pleasure, why shouldn't he feel that he has as good claim as any member of today's society to the choicest of its goods?

This camera is dubbed "the expert's automatic."

This is just a phrase. (Don't let little things like that bother you.) The phrase tries to say that despite the luxury of fully automatic exposure control, the user has



Quite a few of us from Rochester have been dropping in at our Retina factory in Stuttgart to admire how our cousins work.

An invitation to engrave

The etching of glass must be restricted to only those who have learned a proper respect for hydrofluoric acid.*

Etching is, of course, not the only way to dig into a glass surface. With sufficient patience and skill a grinding wheel yields superb results. If time flits too rapidly for that sort of monkeying around, you coat a resist over your surface, scribe through it, and let the HF go to work.

In case the pattern is intricate, or needs to be repeated, or both, you want a photosensitive resist. Then you can draw up the pattern once, nice and big and black, reduce it photographically onto a *Kodalith* material and use the resulting photograph as a mask which

determines where the resist comes off and exposes the naked glass to HF.

Think a moment what you are asking of any photosensitive resist. It must be capable of being switched by a reasonable amount of light from one to the other of two conditions: a) tenacious adherence to the particular material you wish to etch and impenetrability to agents which rapidly attack that material; b) abject submission to attack by agents which do not affect the substrate, or alternatively, full permeability to appropriate etchants for the substrate.

Obviously, we have given this matter much more than a moment's thought. Our researches have now brought forth a photosensitive resist for glass and silicate ceramics to join our previously announced *Kodak Photo Resist*

("KPR," for copper, clear anodized aluminum, and high-copper alloys) and *Kodak Metal-Etch Resist* ("KMER," for other metals). We would be justified in trying to recover all that thinking expense by selecting a similar proprietary name to imply the discovery of a new chemical compound but have decided on a cleverer course...

We shall have you buy *Kodak Metal-Etch Resist* and tell you how to convert it to a glass-etch resist by the use of those two arcane compounds, technical-grade aluminum stearate and sulfur-free xylene.

For details, write *Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y.* If you don't want to bother stating your problem, just say "photosensitive resists."

Try these paragraphs:

Routine commercial news item: *Kodak Phototypesetting Film* and *Kodak Phototypesetting Paper* are now sold by your* Kodak dealer.

Deeper historical significance: Gutenberg did a fine thing by inventing movable type. The fellows who improved on his idea with hot-lead-casting typesetting machines also did their bit for civilization. Now, however, too many authors want to convey too many complicated thoughts to too many splinter groups of readers. The hot-lead machines are at their best with neat paragraphs of well-carpentered prose. Well-carpentered prose has its place, but for expressing the more severely logical varieties of thought it is limiting, imprecise, unclear, windy, and cumbersome. A more agile symbolism is needed at popular prices. Alert printing houses are trying to provide this symbolism through photographic methods rather than through the brutish hewing of lead. Give them time and encouragement. We have added our little touch of encouragement by having these two paragraphs phototypeset. Whether severely logical or not, they look all right, don't they?

*Everybody, more or less, has a Kodak dealer. One person can have several different Kodak dealers, even as one person at different times can have different interests and needs. If you ever hear of a Kodak product that interests you, never fester in doubt as to where to turn. Just write "Eastman Kodak Company, Rochester 4, N.Y." on the front of a postcard and write your question, name, and address on the back. Don't forget to mail it.

*A far more suitable pastime for the amateur is photography. See item above column.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

Kodak
TRADE MARK

ASTRONOMY

Find Odd-Ball Radio Star

An individual radio star has been pinpointed for the first time. It emits radio signals ten million times stronger than the sun but seems to contain no hydrogen.

► **FOR THE FIRST TIME**, an individual star that sends out radio signals has been detected.

The radio star, known as 3C-48, is an "odd-ball." Its peculiar properties baffle the astronomers who found it was the first true radio star.

It was located by scientists at California Institute of Technology's Radio Observatory in Owens Valley, Calif. Its identification was confirmed, using the 200-inch Hale telescope at Mt. Palomar Observatory. The radio star may be relatively close, as astronomical distances go, to the solar system.

It is believed that 3C-48 emits radio signals ten million times stronger than the sun which is also a radio source. The star is of 16th magnitude so it can be seen only with a large telescope. It is located in the constellation Triangulum which is close in the sky to the Andromeda Nebula.

If 3C-48 is surrounded by high-energy electrons moving in a magnetic field at near the velocity of light, the resulting synchro-

tron radiation would produce both its light and its radio signal.

The star's emission of light in ultraviolet wavelengths is unusually high for its yellowish color, astronomers reported. This also indicates synchrotron action. The faint gaseous cloud that surrounds the star may be many times the diameter of the sun.

Spectrograms were made at Mt. Palomar to find out the composition of 3C-48. The results were unlike that of any other star now known. The star itself or its gaseous cloud contains ionized calcium, ionized and neutral helium and possibly oxygen, ionized many times. Its spectral lines do not show hydrogen, generally the main fuel in stars and almost always seen in stellar spectra.

Thomas A. Matthews of Caltech obtained the precise location for 3C-48. The Hale telescope spectrograms were taken by Dr. Jesse L. Greenstein, Dr. Guido Munch and Dr. Allan R. Sandage of Mt. Wilson and Palomar Observatories.

• Science News Letter, 79:67 February 4, 1961

occurred only six times in two centuries.

However, just because there is no full moon in February does not mean that the year 1961 will have fewer full moons than usual, Prof. Smiley said. On the contrary, such a year will almost always have two full moons in January and two in March, with 13 (the maximum possible) for the year's total.

The year 1961 will have its full quota of 13 full moons, despite February's lack.

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TESTING MOLTEN SALT

ASTRONOMY

New Jupiter Spot Theory

► **THE FAMED RED SPOT** on the planet Jupiter is not free-floating in the atmosphere, as many astronomers have suggested since it first was observed 83 years ago.

The red spot, as seen from earth, is the top of a fluid column of the planet's heavy poisonous atmosphere confined above a surface peak by surrounding whirling winds, the British astronomer, Dr. Raymond Hide, believes.

Dr. Hide of Kings College, University of Durham, England, is a visiting professor at Massachusetts Institute of Technology.

He discounted the long-held floating object theory because the spot remains in the same latitude, even though its rotation rate is not uniform with that of the planet.

The change in rotation rate is caused by the atmosphere of Jupiter, which is so thick that it can move solid parts of the planet, thus changing the rotation rate of the moved part, Dr. Hide said.

"There is very little motion of the red spot itself. It moves with the peak to which it is attached," Dr. Hide said.

He noted that the spot, red when first seen in 1878, now appears brown. It is estimated to be 25,000 miles long and 8,000 miles wide.

Dr. Hide calculates that the height of the peak to which it is attached is "probably

less than six miles." But the thick noxious atmosphere of ammonia, hydrogen, methane, helium and nitrogen "may be 6,000 miles deep." Such a deep atmosphere in motion is quite capable of moving solid parts of the planet Jupiter, just as a tornado on earth can move and tear up parts of the earth, Dr. Hide said.

Jupiter is the largest planet in the solar system with a total mass 300 times that of earth. Its solid surface is obscured from view by heavy clouds, believed to be ammonia crystals.

Gravity on Jupiter is three times the force of earth's gravity.

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ASTRONOMY

No Full Moon Will Shine In February Skies of 1961

► **THERE WILL BE** no full moon in February. February is the only month that can come and go without a full moon occurring.

When did this happen before, and when will it happen again? Prof. Charles H. Smiley of Brown University reports that it happened in 1866, 1893 and 1915, and that it will happen again in 1980 and 1999, and then not again until after 2066. Thus, a February without a full moon will have

TECHNOLOGY

Salt as Raw Material In Electronic Components

► **MOLTEN SALTS**, tested on a tiny platinum screen, may be used as raw material for electronic components. Minneapolis-Honeywell scientists have developed advanced infrared measuring techniques to determine the basic structure of salts when heated to the liquid stage. Molten salts have already been used to generate electricity and as electric switches.

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TECHNOLOGY

Rocket Engine Fuel Tanks Made from Spun Glass

See Front Cover

► **ROCKET ENGINE FUEL TANKS** are now being made on an experimental basis from spun glass threads one-tenth the diameter of a human hair. 180 individual glass fibers are spun together, then wound around a pattern and bonded together with a plastic resin. When the resin is dry, the pattern is removed and the tanks capped.

The tanks, produced by the Boeing Aerospace Division, are 21 feet long and hold 3,100 gallons. They are designed to withstand a pressure of 665 pounds per square inch.

The principal advantage of fiber glass is lower costs and light weight.

• Science News Letter, 79:67 February 4, 1961

MEDICINE

Prevent Heart Attack

► **WEIGHT REDUCTION** and reduction of fat in the diet were urged as among the possible ways of "reducing the dreadful toll of heart attacks."

"By eating less, you live longer to eat considerably more," Dr. Irvine H. Page, director of research at the Cleveland Clinic Foundation, told a conference on atherosclerosis sponsored in New York by the New York Heart Association.

Bicycle riding for exercise, maintenance of normal blood pressure and avoidance of excesses of all kinds were among the other recommendations Dr. Page made.

Only since President Eisenhower's heart attack and Stalin's death from stroke, Dr. Page said, has atherosclerosis, a form of arteriosclerosis that leads to hardening of the arteries, received the attention that such a major health problem deserves.

Dr. Richard Warren of Harvard Medical School, Boston, Mass., said no operation has yet been devised that can prevent this disease or alter its course.

"But the surgeon can help the arteriosclerotic patient," he said, "by relieving him of certain specific complications of his disease."

Dr. Warren said arteries so damaged that circulation is obstructed, or those in danger of rupture, which might cause fatal hemorrhage, can be replaced.

Veins from the patient himself, arteries from other patients or tubes of plastic fabric can be used for the purpose. He said obstructed arteries can be unplugged by removing the diseased center and leaving the outside wall.

Where the arteries are in the lower half of the body, such as those leading to the kidneys and intestines, or arteries leading to the arms or to the brain, replacement and unplugging operations have become established procedures, Dr. Warren said.

Still in the experimental stage, however, are operations on arteries within the skull and in the heart muscle, he reported.

• Science News Letter, 79:68 February 4, 1961

PUBLIC HEALTH

Fake Health Devices Hit

► **FAKE "HEALTH" MACHINES** not only take millions from a gullible public but hasten the death of thousands who delay valid medical treatment.

The machine quack who makes devices out of odds and ends of metals, wire and radio parts was denounced in *Today's Health*, Feb., 1961.

"With these gadgets—impressive to the gullible because of their flashing light bulbs, ticks and buzzes—" the machine quack carries out "a vicious medical con game, capitalizing on people's respect for the electrical and atomic wonders of our scientific age."

In such diseases as cancer, tuberculosis, heart disease and diabetes, the article said, "Doctor Fraud's cure-all gadget" can prove fatal.

Federal laws provide only one year in

jail and \$1,000 fine for initial offenders in machine quackery. The Food and Drug Administration is handicapped, therefore, in its constant battle against charlatans.

The AMA bureau of investigation has set up rules to help educate the public in spotting a quack. Beware, the bureau warns, if:

1. A medical "expert" uses a special or "secret" machine or formula he claims can cure disease.
2. He guarantees a quick cure.
3. He advertises or uses case histories and testimonials to promote his cure.
4. He clamors constantly for medical investigation and recognition.
5. He claims medical men are persecuting him or are afraid of his competition.
6. He tells that surgery, X-rays or drugs cause more harm than good.

• Science News Letter, 79:68 February 4, 1961

OPHTHALMOLOGY

Electrode for Eye Surgery

► **A NEW TYPE** of liquid electrode has been developed for eye surgery.

Experimental studies have indicated this new type of electrocoagulation equipment may be effectively and safely applied to treatment of retinal detachment and certain types of glaucoma.

The instrument is composed of a glass tube containing saline solution and an electrolytically coated silver wire. Treatment current is transmitted through the silver wire and saline solution to the tissues of the eye. A fluid reservoir maintains a

uniform contact pressure and provides replacement of liquid lost through evaporation.

Electrocoagulation, in which a metal electrode is used, is a standard form of therapy in the care of retinal detachment, as well as certain forms of retinal degeneration, cysts and tissue tears.

The purpose of this treatment is to establish a firm union between the weakened tissues and surrounding normal structures and thus prevent the spread of disease in the eye.

The primary advantage of the liquid electrode over the standard metal electrode is the optimum and uniform contact with eye tissue that is established and maintained.

This optimum contact permits careful control of the electrical current used for treatment and makes possible accurate measurement of the electrical properties of the treated tissues. The alterations in treated tissues can then be used as an objective guide to the effectiveness of treatment.

The instrument was developed by Dr. Bradley Straatsma, Kermit Ratzlaff and Dr. Alexander Kolin of the University of California, Los Angeles.

• Science News Letter, 79:68 February 4, 1961

SCIENCE NEWS LETTER

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GENERAL SCIENCE

Chilean Renaissance

► A SCIENTIFIC and educational renaissance is underway in this land that extends from the tropics to the Antarctic. As "Yankee" in tone as any South American nation, Chile is applying to its time-honored colleges and schools new ideas both created in the country and imported from abroad.

The nucleus of this new infusion of action and concepts is the Council of Rectors of the seven principal Chilean universities. A colorful and energetic group, this council, with its technical advisory committee, is the driving force that will reorient both teaching and research by bringing American and other consultants to Chile and sending Chilean professors to the United States and other countries.

The Council of Rectors are diverse in personalities and in some cases in philosophies. They range from the dynamic head of the southernmost University of Valdivia (population 75,000) to the purple robed Archbishop who heads the Catholic University of Chile at Santiago, the capital city.

The Government of Chile has given the Council of Rectors financial sinews that amount to a million and a half dollars annually which, guaranteed for 20 years, amount to a half percent of the income tax revenue of Chile.

This has been reinforced by requested collaboration of the National Academy of Sciences of the United States and the International Cooperation Administration (ICA). In February and March the Rectors and their technical assistants will visit typical universities in Mexico and the United States.

Watson Davis, director of SCIENCE SERVICE, as a member of the National

Academy's cooperating committee, has visited five of the Chilean universities and has lectured at two summer schools for teachers being held in Santiago and Valparaíso. Two Brazilian scientists from São Paulo were members of this joint Brazilian-American mission that discussed, particularly with Chilean secondary school science teachers, the use of simple, inexpensive experimental apparatus that will allow the students themselves to learn science by actual performance of science experiments. The two Brazilian professors were Dr. Isaías Raw and Dr. Romulo Pieroni.

There seem to be good possibilities that a Chilean group of scientists and educators

will be able to produce in Chile for use in its schools, the kind of apparatus and kits that have proved useful in U.S. and Brazilian education.

The Chilean Council of Rectors is utilizing other Chilean and American funds for improving apparatus and laboratories, replacing equipment destroyed by the earthquakes of May, 1960, which damaged seriously Concepcion and Valdivia Universities, for libraries and documentation.

Quite as important as providing facilities for science teaching and research, the Council of Rectors will provide a regular means of exchanging ideas and promoting cooperation between the universities of Chile, which in the past sometimes have not worked together too effectively. This may be the most valuable result of the new development of Chilean science and education.

• Science News Letter, 79:69 February 4, 1961

ASTRONAUTICS

Germfree Men for Space

► GERMFREE men may be the ideal space pioneers.

Such bacteria-free astronauts would not contaminate the moon or other extraterrestrial areas to be explored. They can be available in 25 years, Dr. Charles Phillips of the U.S. Army Chemical Corps Biological Laboratories, Ft. Detrick, Md., reported to the National Aeronautics and Space Administration in Washington, D.C.

"The same methods used to obtain sterile guinea pigs, chickens and rats, will produce a sterile man. All we will have to do is to keep him in a germ-free cabinet for some 25 years following birth, meanwhile teaching him how to fly spacecraft," he said.

However, producing a sterile spacecraft with all the technical problems involved still is simpler than producing a germ-free man, Dr. Phillips reported.

The airless, barren moon, believed to be the repository of dust and debris of outer space, holds important data that may tell scientists about the origin of the solar system. Contamination might obscure these data, Dr. Phillips said, resulting in loss of "priceless opportunity" to get to the basis of life's origins.

Soviet scientists have said they sterilized the payload landed on the moon. However, even if the Russians did not sterilize the lunar payload, United States policy is to avoid extraterrestrial contamination by using sterilized spacecraft that will remain sterile, the Army biologist said. Dr. Phillips reported great success in developing techniques for sterilizing space equipment.

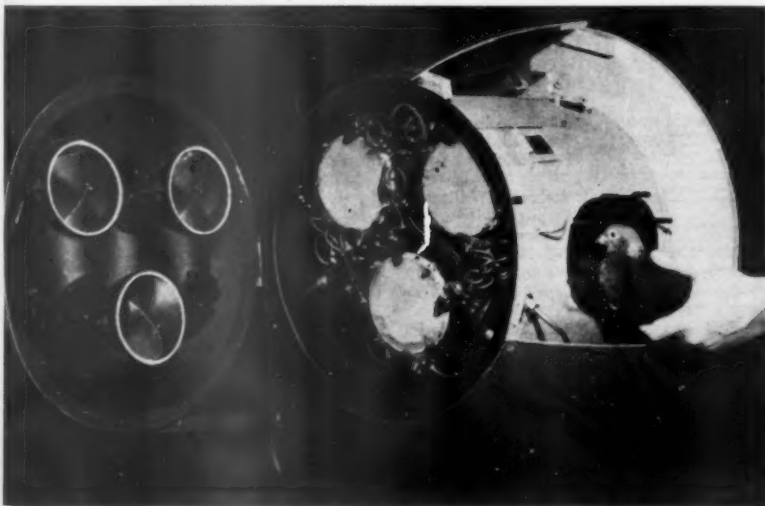
Germ-free animals are available and could be used in interplanetary exploration with marked success to detect possible life forms.

Dr. Stanley Levenson of the Walter Reed Army Institute of Research believes that the animal free of micro-organisms is probably the best sort of culture media to use for collecting and growing samples of extraterrestrial life.

Germ-free animals have very low resistance to ordinary biological agents and even a few organisms in such animals would multiply at "an alarming rate," Dr. Levenson said. This would provide scientists with an animal in which the organisms could be detected by biological means, he said.

Scientists engaged in space research also are working on the problem of avoiding contamination of earth with extraterrestrial matter when man can safely make round trips to outer space from earth.

• Science News Letter, 79:69 February 4, 1961



PIGEONS FOR GUIDANCE SYSTEM—Pigeons have been taught to peck at visual targets on a ground-glass screen of a missile guidance system. The chosen target might be a submarine at sea or a military site on the ground. As long as the pigeons peck at the image on the glass the missile stays on course.

MEDICINE

Cesium Isotope Machine For Cancer Treatment

► ADVANTAGES over cobalt and X-ray treatment equipment for malignant cancers are seen in a new type of radiation therapy machine using the isotope cesium.

The machine was described by Dr. D. J. Wright at the Canadian Association of Radiologists meeting in St. John, N. B., Canada. It was constructed in the work shop of the physics division of the Ontario Cancer Institute and is installed in the Toronto General Hospital.

The basis for advantage over other machines, Dr. Wright said, lies in the use of cesium (a silver white, easily hammered metal with several isotopes) for short- and long-distance treatment procedures for malignancy.

"It is possible to utilize a smaller head for cesium-137 and yet obtain a depth dose similar to that of cobalt-60 for the shorter of these treatment distances (15 and 35 centimeters)," the scientist said.

For the longer treatment distance, he explained, cesium-137 is comparable to doses obtained at 50 centimeters with conventional X-ray machines while avoiding the bone absorption tendencies of such machines.

Pointing out that the new machine has "twin treatment ports" allowing therapy at either 15 centimeters, or alternatively 35 or 50 centimeters, he said such a unit would be ideal for a small department.

Coauthors of the report were Drs. H. E. Johns and C. L. Ash. All three scientists are associated with the Ontario Cancer Institute in Toronto.

• Science News Letter, 79:70 February 4, 1961

GENERAL SCIENCE

Arizona Twins Win Talent Search Honors

► A SET OF TWINS, 17-year-old boys, who attend the same Phoenix, Ariz., high school are among the 399 nationally selected seniors who won honors in the 20th annual Science Talent Search announced by SCIENCE SERVICE.

They are George Carl Farnbach and John Sevier Farnbach, 536 E. Cheery Lynn St., students of North High School, Phoenix.

George did a project using Grignard reagents, which are used in the preparation of organic compounds, and John worked on paper chromatographic analysis of five principal sugars of wood.

Twins in the honors list of the Science Talent Search are a rarity, although in 1950 two girls of a set of triplets not only won honors, but were among the 40 top winners of trips to Washington. The other triplet did not compete, being more interested in music than science. The multiple birth winners that year were Patricia and Cynthia Jackson, then 17 and living in Forest Hills, N.Y. Patricia attended Hunter College High School and Cynthia, High School of Music and Art, both in New York City.

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GENERAL SCIENCE

Washington Trip Winners

(See p. 74)

HOME ADDRESS follows name of school

Phoenix

Fox, Donald Jensen 17 West H.S. 2314 W. Pinchot St.

Denver

Chessen, Douglas Howell 17 East H.S. 6301 E. 22nd Ave. 7

Washington

Newlon, Michael Clarke 17 Western H.S. 3714 Massachusetts Ave. 11

Coral Gables

Melson, Eloise Ann 17 Coral Gables Sr. H.S. 1507 S.W. 19th Terrace Miami 41

Melbourne

Adkins, William Milton III 17 Melbourne H.S. 67 Lund Circle

Atlanta

Kane, Daniel Frederick Jr. 17 Joseph E. Brown H.S.

1626 Rogers Ave., S.W. 11

Hosford, James Michael 17 Northside H.S. 1080 Northcliffe Dr., N.W. 11

Idaho Falls

Wheeler, John Craig 17 Idaho Falls H.S. 239 11th St.

Chicago

Dworkin, Barry Ronald 16 Amundsen Sr. H.S.

Evanston

Axelrod, Robert Marshall 17 Evanston Twp. H.S.

Highland Park
LaGrange

McGivern, Thomas John 17 Highland Park H.S. 347 Elm Pl.

Phillips, Roger Morgan 16 Lyons Twp. H.S.

5434 Grand Ave., Western Springs

South Bend

Peters, Roger Paul Jr. 17 Central H.S. 557 Edgewater Dr.

Raymond, Robert Lee 17 Central H.S. 1205 N. Kaley 28

Cedar Falls

Wilson, Mary Sue 17 Malcolm Price Laboratory School 1203 W. 23rd St.

Louisville

Kleinman, Daniel Ellis 17 Atherton H.S. 1414 Goddard Ave. 4

Bladensburg

Andrews, Thomas Gaylord Jr. 17 Bladensburg Sr. H.S.

5903 Euclid St., Cheverly

Kottke, Margaret Ellen 17 Bladensburg Sr. H.S.

3209 Tremont Ave., Cheverly

Quincy

Hoffman, Donald Richard 17 North Quincy H.S.

80 Forbes Hill Rd., Wollaston 70

Revere

Cecere, Mary Ann 17 Revere H.S. 300 Malden St. 51

Kansas City

Barisas, Bernard George Jr. 15 Southeast H.S. 6319 S. Benton St. 31

Omaha

Josephson, Paul Douglas 17 Omaha Central H.S. 1507 N. 54th St. 4

Brooklyn

Alben, Richard Samuel 16 Erasmus Hall H.S. 213 Albemarle Rd. 18

Kaufman, Laura Sue 16 Erasmus Hall H.S. 45 Hawthorne St. 25

Lesk, Michael Edward 15 Erasmus Hall H.S.

225 Marlborough Rd. 26

Rothman, William David 16 Erasmus Hall H.S. 297 Lenox Rd. 26

Bernstein, Herbert Jacob 16 New Utrecht H.S. 1342 51st St. 19

Gordon, Robert Jay 16 Yeshiva of Flatbush H.S. 2480 84th St. 14

Fell, Harriet Jane 16 Jamaica H.S. 75-32 179th St. Flushing 66

Wallman, Joshua 17 Bronx H.S. of Science 23 E. 69th St. 21

Lepowsky, James Ivan 16 Stuyvesant H.S.

143-11 Barclay Ave., Flushing 55

Jamaica

New York

Tate, William Charles 17 Penfield Central H.S.

Penfield

11 Dogwood Glen, Rochester 25

Staten Island

Rappaport, Bernard Sandor 17 New Dorp H.S. 72 Tenth St. 6

Cleveland

Fairborn

Tipp City

Manak, Rita Carol 16 Lourdes Academy 2217 Montclair Ave. 9

Mayer, Ann 17 Fairborn H.S. 572 Wayne Dr.

Smith, Dale Thorpe Jr. 18 Tippecanoe H.S. 7276 S. Dixie Dr.

Beaverton

Hubbell, Wayne Lester 17 Beaverton H.S. 4450 S.W. 96th St.

Austin

Matsen, Frederick Albert III 16 Stephen F. Austin H.S.

1800 San Gabriel St. 1

Fort Worth

Harkins, Anna Marie 17 Arlington Heights H.S.

4010 W. Fourth St. 7

Arlington

Jones, Edward Charles 17 Wakefield H.S. 6807 N. 29th St. 13

VIRGINIA

GENERAL SCIENCE

20th Science Talent Search

399 students have been selected as the honors group of the 20th Science Talent Search. Out of these the 40 top winners for the Science Talent Institute have been named.

► **THE MOST TALENTED** young scientists in the 1961 high school graduating classes have been selected.

The 40 winners of the 20th national Science Talent Search have been selected from among 3,991 high school seniors who submitted entries.

In addition, 399 have been given honors in this nation-wide selection of those young scientists who are judged to have potential scientific creative ability for the future.

The 399 students receiving honors are 15 to 19 years old and go to school in 220 communities in 41 states and the District of Columbia. Their principals rank them very high in their graduating classes, with 68% of the boys and 78% of the girls in the top five percent and with the rank of first, second or third being given to at least 17% of the boys and 41% of the girls.

The outstanding student-scientists include 93 girls and 306 boys, with the ratio of girls among the members of the Honors Group determined each year by the number

of girls who complete entries. All of the group will be recommended for admission and scholarship awards to the nation's colleges and universities.

The forty top winners, nine girls and 31 boys from 18 states and the District of Columbia, have been invited to come to Washington for the five-day Science Talent Institute, to be held here March 2 through March 6, during which they will be judged for \$34,250 in Westinghouse Science Scholarships and Awards.

These scholarships and the operation of the Search are supported by the Westinghouse Educational Foundation of the Westinghouse Electric Corporation.

Will Receive Further Recognition

Many of the Honors Group will receive further recognition in state Science Talent Searches conducted on a local level as part of the national Search. It is conducted annually by Science Clubs of America, an activity of SCIENCE SERVICE.

Already at work on a great assortment of new ideas, these novice scientists may be very accurate prophets of the world of the future. The project papers they submitted as part of the stiff entrance requirements of the Science Talent Search are dramatic evidence of the scope and depth of their interest and ability.

As would be expected, current advances in computer science have stimulated many of these young people to try their own hands and ingenuity in this field. One 17-year-old, Bruce M. Sieben of Chicago, has proposed an adaptation of the digital computer that would make pattern recognition possible. A 16-year-old aspiring mathematician, Ray S. Jackendoff of Glenside, Pa., investigated the production of music by computer. Still another young innovator, Robert M. Axelrod, 17, of Skokie, Ill., has devised a way to study life forms and environmental factors by simulating them on a computer.

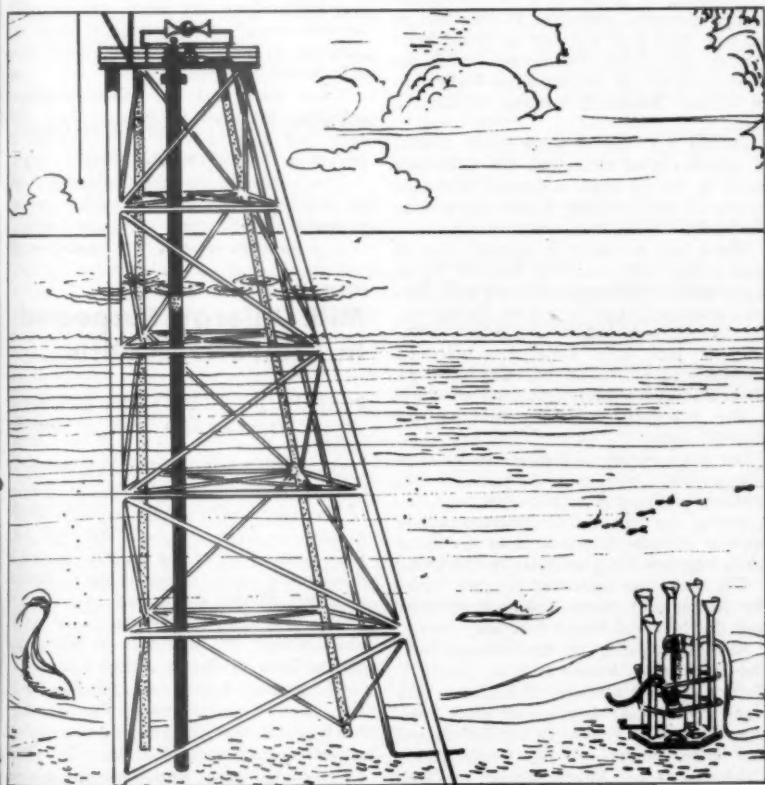
The cleaning ability of ultrasonics caught the interest of a Hickory, N. C., boy, Samuel D. Harmon, 17, while another North Carolinian, Charles L. Kling, also 17, Washington, N. C., looked into the lubricating qualities of graphite at various altitudes.

One of the girls, Patricia A. Bytnar, 16, of Pittsburgh, Pa., has been experimenting with the effects of sodium fluoride on plants and animals. The lung structure and water conservation of the desert iguana appealed to Robert E. Fine, 16, Van Nuys, Calif., as an important subject to explore.

Other projects carried out with great competence by this group of high school seniors run the gamut from abstruse mathematics to the study of a hormone that controls the molting of a crayfish.

Anyone may have a copy of a booklet containing the names of the Honors Group by sending a long, self-addressed envelope bearing an 8¢ stamp to Science Clubs of America, 1719 N Street, N.W., Washington 6, D. C.

• Science News Letter, 79:71 February 4, 1961



OIL CHRISTMAS TREE—Is now placed on the ocean floor.

ENGINEERING

Offshore Oil Well Equipment on Sea Bottom

► **THE FIRST OFFSHORE** oil well to have flow equipment resting on the sea bottom has been completed. Prior to this development, the equipment for controlling the flow of oil, called the "Christmas Tree," was placed on a platform above the water. The Christmas Tree is guided to the ocean floor by remote control from a surface drilling platform.

Once the well is completed, the drilling platform is moved to a new site. The new technique, used by Shell Oil Company, will help obtain more oil and gas from the outer continental shelf of the United States.

• Science News Letter, 79:71 February 4, 1961

PUBLIC HEALTH

Sea Salts Not Necessary In Diet, AMA Decides

► THE AVERAGE AMERICAN mixed diet, except for iodine and iron deficiency in certain areas, needs no bolstering with mineral sea salts, according to the American Medical Association.

Nutritional claims made for such commercially prepared salts are typical of the claims made by food faddists.

Dr. Ogden C. Johnson of the AMA Council on foods and nutrition reports in the *Journal of the American Medical Association*, 175:265, 1961, such claims are invariably made by food faddists and quacks whose "prime interest is in making money."

Physicians reading the *Journal* also will get some advice on lead poisoning connected with industries from Dr. Perk Lee Davis, Paoli, Pa. (p. 257) and Dr. Frederick E. Zimmer of Danville, Pa.

Dr. Davis's patient was a 43-year-old gas-tation owner who washed the upper part of his body with gasoline at the end of a day's work, but always bathed with soap and water later at home. Although his complaints were severe, three daily intravenous injections of edathamil calcium-disodium in five percent glucose in water and an intramuscular injection on the fourth day of dimercaprol (BAL) produced complete recovery.

Dr. Zimmer reported that seven scrap metal workers suffered lead poisoning while using torches to cut heavily painted steel bridge girders. Poisoning resulted from the high concentration of lead found in the fumes created by the work.

Samples of air taken where the men were working contained up to 20 times the maximum allowable concentration, he said, adding that paint chipped from the girders contained 21.6% lead.

• Science News Letter, 79:72 February 4, 1961

GEOGRAPHY

Volunteer Map-Makers Produce Two Atlases

► TWO LARGE GROUPS of volunteers have put finishing touches on two atlases that would have cost millions of dollars to compile if the work had been done by professional geographers.

One of the new atlases, made by English geography teachers and students, records how all land in England and Wales is being used. It is the first national land use survey made in more than 30 years.

Recorded in the new atlas, which has 848 sheets in all, are 14 categories of industry, houses, gardens, open spaces, grass-land, every varied use of arable land, every kind of truck garden, orchards, woodlands, heath, scrub, marsh and water. For the first time, all derelict land in the two countries has been mapped, as well as caravan sites and disused railroad tracks.

The project was sponsored by the Isle of Thanet Geographical Association, whose

chairman, Miss Alice Coleman, a geographer of King's College, London, led the volunteer map-makers.

The other "do-it-yourself" mapping job was carried out by more than 2,000 observers and is a complete "plant atlas" of Britain. It is now being printed in Cambridge, England, and will be published in February, 1962.

This volume, which will have more than 500 pages, will record on separate "plant maps" the distribution of some 1,700 specimens. It was prepared by the Botanical Society of the British Isles under the direction of Dr. Franklyn H. Perring of the Cambridge University Botanic Garden.

One finding of the survey is that the sundew, which catches small insects by trapping them in its sticky leaves and is one of only three carnivorous plants in Britain, is dying out. This is attributed to the increased drainage of the wet, marshy places that are the sundew's natural habitat.

• Science News Letter, 79:72 February 4, 1961

MEDICINE

Hormones Prolong Life After Heart Attacks

► PROLONGATION OF LIFE for male heart patients through use of female hormones is claimed by a woman physician and four male colleagues at the University of Southern California and the USC School of Medicine.

Premarin, a preparation of conjugated equine estrogens, improved the survival of 62 men who had had one or more heart attacks, Dr. Jessie Marmorston told the western section of the American Federation of Clinical Research meeting in Carmel, Calif.

During a period of three to 18 months of uninterrupted treatment, she said, only three of the 62 died, compared with 123 untreated men among whom there were 17 deaths.

There was no effect on survival time of men treated with two other types of female hormones, or estrogens, Anvene and Lynoral, given to 73 and 96 patients respectively, Dr. Marmorston said.

Blood fats were lowered (cholesterol phospholipid ratio) among the heart patients who took Lynoral and Anvene, which, unlike Premarin, had no effect on the survival time.

Dr. Marmorston said these results show it is possible to improve the survival time without lowering the blood fats, and that lowering the blood fats, contrary to the opinion of some scientists, does not necessarily lengthen life. (See SNL, 78:212, 1960.)

The study was supported by grants from the Albert and Mary Lasker Foundation and the National Heart Institute.

Also participating in the research were Dr. Frederick J. Moore and Dr. Oliver T. Kuzma of the University of Southern California, Dr. Oscar Magidson of the University of Southern California Medical School, and John Weiner of the University of California at Los Angeles School of Public Health.

• Science News Letter, 79:72 February 4, 1961

IN SCIENCE

DENTISTRY

Tooth Decay Healed By Rehardening Enamel

► A METHOD for preventing and curing tooth decay has been found. No drilling and filling, only chemical solutions that re-harden the tooth enamel in the spots beginning to decay are used.

Drs. Theodore Koulourides, Heriberto Cueto and Ward Pigman, biochemists at the University of Alabama Medical Center, in Birmingham, Ala., were successful in re-hardening tooth enamel in test tubes containing solutions of calcium and phosphorus.

More than 300 teeth were softened in an acetate buffer solution and then exposed to the rehardening agents. Teeth placed in a chemical solution of secondary calcium phosphate dihydrate returned to their original hardness in eight days. Those in synthetic hydroxyapatite solutions containing one part per million of fluoride rehardened in four hours. Hydroxyapatite is a natural inorganic component of teeth.

Teeth softened beyond a certain point in the hardness scale, however, could not be rehardened appreciably. This point, the researchers believe, represents the boundary between sound and decaying enamel, and attempts to rehard such soft teeth probably would be futile.

Those teeth that did reharden resisted softening solutions more vigorously than they had previously, the biochemists reported in *Nature*, 189:226, 1961.

They conclude that the beginning stages of decay probably can be healed or prevented by modification of the oral fluid.

• Science News Letter, 79:72 February 4, 1961

MEDICINE

Milk Allergy Suspected In Ulcerative Colitis

► ALLERGIC REACTION to milk is now strongly suspected as a cause of ulcerative colitis.

Dr. S. C. Truelove of the University of Oxford, England, reported that a number of his patients with ulcerative colitis seemed to improve when milk was removed from their diets. Five of the patients agreed to drink milk again to see if the symptoms recurred. Within a few days or weeks, all five patients had another attack of colitis, characterized by discharge of blood and mucus from the lower digestive tract.

Cheese caused the same reaction in all five, as did eggs for two of the patients.

The odds that the relapses occurred by chance are about 1,000 to one, Dr. Truelove reported in the *British Medical Journal*, Jan. 21, 1961.

• Science News Letter, 79:72 February 4, 1961

NE FIELDS

ENTOMOLOGY

Black Widow Spiders Plague Parts of Hawaii

► **BLACK WIDOW SPIDERS** are heavily infesting parts of Hawaii, the Agricultural Research Service reported in Washington, D. C.

The black widows were found in large numbers under the galvanized-iron termite shields of buildings at Leeward Estates, a fairly new subdivision at Ewa, Oahu. About 50 acres of land being developed by Oahu Sugar Company on the coral shelf of Waipio Peninsula had one large black widow female per square foot.

Such large numbers of black widows have not been seen in Hawaii since 1944. At that time, an insect, *Eurytoma latroducti*, that parasitizes the eggs of the black widow appeared on the island.

Field investigators reported that the sites plagued by black widows are also overrun with mice.

At present there seems to be no need for a spider scare. The black widow, a poisonous spider, avoids human contact. There has been no noticeable increase in the number of bites, and the egg parasite is now destroying about 90% of the black widow's egg masses.

• Science News Letter, 79:73 February 4, 1961

PUBLIC HEALTH

Recommendations Made For Polio Control

► **FOURTEEN** RECOMMENDATIONS for the control of poliomyelitis were submitted to the Surgeon General of the Public Health Service by his advisory committee at the conclusion of its two-day meeting at the Service's Communicable Disease Center, Atlanta.

Eight of the recommendations concern more intensive use of the Salk, or formalin-inactivated vaccine now available to prevent polio during 1961. Six deal with programs for the future after oral vaccine becomes available.

The advisory committee included representatives of the public health and medical profession and the general public.

A "Babies' and Breadwinners' Campaign," referring to the need for vaccination of young children under six years of age and to the plan for local community drives to reach the lower socio-economic levels, was endorsed.

Among the immediate steps to be taken are intensification of the vaccination program with available Salk vaccine. First priority is to be given to attaining complete and early coverage of the infant and preschool group under six years of age.

Each state and local health department should accept responsibility for seeing that

there is effective organization of medical, public health, educational and citizens' resources within its jurisdiction, the recommendations state.

Further research is recommended in the field of inactivated as well as live virus vaccines. It is planned to have reserves of polio vaccine for epidemic use and to give assistance to other countries for the control of polio.

Efforts are to be made to provide more potent inactivated vaccine that will require fewer doses.

• Science News Letter, 79:73 February 4, 1961

TECHNOLOGY

Use Radioactive Wastes For Water Conversion

► **RADIOACTIVE WASTE** products from atomic plants may soon be a source of energy for converting salt water to fresh water. This use could help solve the problem of disposing of highly radioactive material, and also help combat the growing water shortage in the United States.

Dr. A. L. Miller, director, office of saline water of the Interior Department, Washington, D. C., reported that the energy from the waste products could provide the heat source for a salt water distillation plant. One batch of radioactive material, in powder form, could give off heat for 15 years, he estimated. Cost for this heat source in the United States would be competitive with oil and other forms of energy, Dr. Miller said.

The powder is left as a residue when highly radioactive liquid waste material is heated at high temperatures, driving off all the gases. The powder remaining is easier to transport and safer to handle than the bulky liquids.

Dr. Miller said that a distillation plant utilizing this heat source will be built in the near future in cooperation with the Atomic Energy Commission.

• Science News Letter, 79:73 February 4, 1961

VETERINARY MEDICINE

X-Rays Valuable for Animal Pregnancies

► **ANALYZING PREGNANCIES** in pets is one of the most valuable uses for X-rays among animals.

X-rays can be used for almost as many conditions in animals as in humans, Dr. W. C. Banks, professor of veterinary radiology at Texas Agricultural and Mechanical College, reported.

Dr. Banks told the Wisconsin Veterinary Medical Association in Milwaukee, Wis., that the use of radiology for pregnancy analysis includes determining if pregnancy exists and whether the female has given birth to all the babies in her litter.

Pneumonia can be diagnosed by X-ray, he said, by showing lung congestion, if any, and malignant tumors can be studied. The use of film in preference to the fluoroscope was suggested by Dr. Banks, because a film can be studied more thoroughly than a screen.

• Science News Letter, 79:73 February 4, 1961

MEDICINE

New Technique Repairs Encrusted Heart Valves

► **HOPE IS OFFERED** to patients with a heart condition known as acquired aortic stenosis through a new technique for repairing calcium-encrusted heart valves.

Drs. Donald Mulder, Albert Kattus and William Longmire of the University of California, Los Angeles, Medical School reported their experience with 13 patients on whom the new surgical procedure was performed.

In acquired aortic stenosis, a calcium compound encrusts the valve that controls flow of blood through the large artery (aorta) emerging from the heart. As a result blood flow is obstructed, and heart pain, fainting spells or failure of the heart may result.

In the new surgical procedure, the calcium deposits are removed from the valve, and the obstruction is thus relieved. Any damage caused by the deposits is repaired so that the valve function is restored.

All 13 of the patients on whom the procedure was performed have had relief from symptoms and continue to show improvement. Some have been followed for as long as two years, the doctors reported in the *Journal of Thoracic and Cardiovascular Surgery*.

They said it was too early to predict whether or not the calcium deposits will recur.

• Science News Letter, 79:73 February 4, 1961

METEOROLOGY

Ancient Inscriptions Used to Study Sun

► **ANCIENT INSCRIPTIONS** of Egyptians and Chinese are being studied by modern day scientists to learn more about the ways of the sun. Together with modern scientific methods, scientists are trying to determine the sun's activities during the last 1,700 years.

Sunspot and "northern lights" observations in Asia, North Africa and Europe as far back as 220 B.C. have been used, Dr. Justin Schöve of St. David's College, Kent, England, told the combined New York Academy of Sciences and American Meteorological Society meeting in New York. These observations are depicted, for example, on dated wall paintings by the medieval Chinese.

From this material, periods of strong and weak solar activity have been determined, and changes in the length of the well known 11-year solar cycle have been found, Mr. Schöve said. The great famines and droughts recorded by the Islamic people in Asia reflect the effect of the solar cycle on the climate.

Modern scientific methods will supplement the studies of ancient records, the scientist said. Radiocarbon dating of tree rings and clay varves on lake bottoms will permit scientists to determine solar cycles even before 220 B.C.

• Science News Letter, 79:73 February 4, 1961

GENERAL SCIENCE

How Science-Minded Are You?

Take this brief test and find your science talent. The test is a short version of the two-and-one-half-hour Science Aptitude Examination taken by high school seniors in the 20th Annual Science Talent Search.

► DO YOU KNOW why the ludicrous looking giraffe has ambled into the laboratory as an important subject of medical research?

Can anybody but a honey bee hear a noise that will stop the bee in his tracks?

How many times 79 is "giga 79"?

If you have some ideas about any of these questions, you may have much more scientific ability than you have been giving yourself credit for.

You can take a quick sample of your potential in a few minutes by choosing the best answer to some interesting questions. They are part of a brief version of the two-and-a-half-hour Science Aptitude Examination given to thousands of high school seniors in December who entered the 20th Science Talent Search for the Westinghouse Science Scholarships and Awards.

For your private testing, allow yourself 20 minutes to complete the sample, then check your answers with those in the answer box on page 78.

If you are astonished and delighted to find that all of your answers are right, you should be. Not one of 150 Science Talent Search contestants selected at random did as well as that.

Give yourself one point for each of your correct answers. A high score on this short version would be at least 13 out of a possible total score of 22. Of the 150 random selections, 41 students did this well or better. A low score would be eight or less. Thirty-four students were down here at the lower end of the totem pole.

The random sample shows that the easiest questions were 32, 91 and C.1. Each of these was answered correctly by 77% or more of the 150 students. Questions 15, 27 and 30 were the hardest with each of these drawing correct answers from only 19% or less of the hopeful test-takers.

The "roughest" question apparently was 15, since only 15% of the students knew what kind of clouds are normal traveling companions for *altocumulus castellatus*.

The easiest was 32. Nearly everybody, 92%, found it very simple to choose the right answer from the paragraph about Uranus.

If your score does not look very dazzling when you come to compare it to the students', take comfort in knowing that the test is deliberately designed to screen out all but the best among thousands of very able students. No one ever has made a perfect score in the 20 years of the Search.

Dr. Harold A. Edgerton, New York consulting psychologist and chairman of the Science Talent Search judging committee, constructed the 20th Science Aptitude

PART A

DIRECTIONS: Four possible answers are given for each question. Choose that answer which is most nearly correct.

13. In experiments to determine how honey bees react to simple sounds, it was found that sound at a frequency of 800 cycles per second at about 120 decibels "stops" honey bees in their tracks. They remain "frozen" as long as the sound continues, but return to full activity as soon as the sound is stopped. The sound described is
 1. audible only to insects
 2. lethal to bees if continued for as much as 120 seconds
 3. not audible to human beings
 4. so loud that some form of ear protection is needed for beekeepers hearing it
14. The prefix "giga" is used to indicate a very large quantity. How many times x is "giga x "?
 1. 10^{12}
 2. 10^9
 3. 10^6
 4. 10^3
15. With what other cloud form is *altocumulus castellatus* usually associated?
 1. alstratus
 2. cirrocumulus
 3. cumulonimbus
 4. nimbostratus
16. Cryogenics is the study of
 1. computer logic
 2. free radicals
 3. the properties of matter under high pressure
 4. the properties of matter at temperatures near absolute zero

17. The giraffe is of interest to medical researchers because of its
 1. excessively high blood pressure
 2. rudimentary vocal cords
 3. susceptibility to certain rare diseases
 4. vitamin deficient diet

26. Which of the following equations is best represented by the graph?

$$\begin{aligned} 1. x + y &= ab \\ 2. y &= ab^x \\ 3. ax^2 + by^2 &= 0 \\ 4. x + y &= ab \end{aligned}$$



27. Borazon is another name for
 1. boronite
 2. boron carbide
 3. cubic boron nitride
 4. sodium tetraborate

28. A *Housekeeper* seal is most likely to be found
 1. in a canning factory
 2. in an electric light bulb
 3. in the Pacific Ocean near California
 4. on an official document

29. Recent advances in radio astronomy have been made possible by which of the following?
 1. earth satellites
 2. low frequency radio waves
 3. masers
 4. microns

30. A coney is a
 1. geometric figure
 2. mammal
 3. rocky island
 4. species of flightless bird

PART B

SECTION Q

The system of mathematical logic consists of basic terms, definitions, and postulates followed by theorems deduced from steps preceding it. There are two possible fates for any proposed theorem: it can be proved from preceding propositions or it can be proved inconsistent with previously accepted propositions and therefore disproved. There are, however, certain "axioms" that are (or have been) true in every case tried, but are not yet proved. In this category are the "four-color theorem" and Fermat's last theorem. No one doubts that these theorems are true, but no one has been able to prove them.

For years this has been a sore spot with mathematicians, but finally some light may have been shed on the subject. In spite of the two possible classical types of theorems (proved and disproved) it has been proved that a third type exists. This is the class that is true (consistent) but can never possibly be proved. The existence of such a class of theorems was proved by Kurt Gödel in 1931.

Gödel's proof is important because it shows that even in systems of logic designed by man there will be certain truths which cannot be deduced by any logical means. This completely changes virtually every branch of mathematics which has its foundation in any logical thought.

90. Which of the following statements is least true?

1. Gödel's proof has had much effect on most fields of mathematics.
2. If a statement has been disproved by classical methods, it cannot possibly be consistent with the postulates of the system.
3. Not all statements true in plane geometry could have been proved by Euclid.
4. Previously proved statements of Euclidean geometry are put in doubt by Gödel's proof.
91. The existence of the third type of theorem
 1. is shown to be the basis of empiricism
 2. demonstrates the need for experimental procedures
 3. leads to less rigorous mathematical proof
 4. opened new avenues of mathematical investigation

PART C

In each of the following groups of four words or symbols, three belong together because of some characteristic or meaning, while one does not belong with the other three because it lacks the common characteristic or meaning. Choose the one in each group which belongs least well with the other three.

- | | | | |
|--------------------|---------------------|------------------|------------------|
| 1. 1. assimilation | 3. 1. uonectinic | 5. 1. catenary | 7. 1. orthone |
| 2. 2. conduction | 2. 2. uonotonic | 2. 2. circle | 2. 2. insulin |
| 3. 3. convection | 3. 3. orthohombic | 3. 3. derivative | 3. 3. penicillin |
| 4. 4. radiation | 4. 4. trilineic | 4. 4. hyperbola | 4. 4. thyroxine |
| 1. 1. angle | 4. 1. biceps | 1. 1. kilometer | |
| 2. 2. angstrom | 2. 2. femur | 2. 2. knot | |
| 3. 3. calorie | 3. 3. gastrocnemius | 3. 3. mile | |
| 4. 4. decibel | 4. 4. sartorius | 4. 4. yard | |

For a complete aptitude examination, send 15¢ in coins to Science Clubs of America, 1719 N. St., N.W., Washington 6, D. C., and ask for the test.

TEST YOUR SCIENCE TALENT—This is a short version of the two-and-one-half-hour examination for the 20th Annual Science Talent Search.

Examination with Dr. Frederick O. Carleton of New Orleans, La.

As one of the measuring devices of the Search, it is designed to test ability to think and reason in terms of scientific concepts and vocabulary. Most science-minded high school seniors find the examination challenging and enjoyable to take since it is much like the problems, puzzles and games so many of them delight in solving.

Scores on this test represent only the first hurdle in the judging procedures that select the students who seem most likely to become outstanding research scientists. There is no predetermined "passing" grade and scores are plotted on a curve to discover which contestants may be qualified for further judging. The qualifying score for boys in the 20th Search was 75; for girls, 65. This allowed a large margin for further selection, for the highest score among the boys was 111 out of a total possible score of 129. Highest score among the girls, who made up 23% of the entrants, was 104.

Contestants Are Evaluated

As the next step, detailed scholastic records of each "passing" contestant were evaluated. Then information offered by the student and his faculty sponsor about his accomplishments, activities, traits and attitudes was weighed carefully to find any of a number of good combinations of achievements and promise.

Each entrant is required to submit a written report of an individual research project. This usually amounts to a thousand or so words of text, plus relevant diagrams, graphs, theorems, pictures, etc. The papers of all the students who survived the first hurdles of the 20th Search were read critically by a board of professional scientists which included specialists in the many fields explored by the student-scientists. This board studied and evaluated reports on everything from an investigation of horse sense to complexes of lead 2,6-dimethyl-4-thiopyrone and the halogens, and computers designed to recognize patterns or compose music.

Then these professional opinions were added to the other evidence for and against each hopeful candidate.

Correlating all of these evaluations, the board of judges selected an Honors Group of 399 students (10% of those with completely qualified entries) who showed outstanding scientific potential. All of these top drawer students are being recommended to colleges and universities for admission and scholarship aid.

To choose 40 top winners from this Honors Group, each detail was reexamined and weighed on an even more precise scale of values. At this point numerical scores had to be combined with subjective judgments based on long experience with, and observation of, potential scientists.

During the Science Talent Institute, to be held March 2 through March 6 in Washington, D.C., the file on each of these 40 will be supplemented by personal interviews. Everything will be weighed again and some very fine hairs may be split to

select the five who will be awarded Westinghouse Science Scholarships ranging from \$7,500 to \$3,000.

In the 20th Science Talent Search 25,355 requests for the examination and other entry materials were received and 3,991 completely qualified entries were judged. Scholastically, 78% of the 93 girls in this year's Honors Group are in the top five percent of their high school classes and at least 41% rank first, second or third. Of the 306 boys, 68% rank in the top five percent of their classes and at least 27% of these are among the top three students.

Some of the traits most characteristic of these promising young people are intense and sustained intellectual curiosity, ingenuity, independence, self-discipline, and an intuitive way of knowing how and why certain theories and facts may fit together. Starting at the sand box age, many of them have investigated an astounding variety of questions.

There is no sameness among this group, except in their interest and ability in science. They are highly individual personalities from every kind of background and with a great assortment of ambitions and motives.

During the Science Talent Institute in March, the 40 winners chosen from this Honors Group will gather in Washington, D.C., for five unique days. In addition to the mutually rewarding experience of learning to know each other, they will meet eminent scientists, visit scientific laboratories of national agencies, and keep their scheduled appointments for interviews with the judges. The Westinghouse scholarships and awards traditionally are announced at the banquet which closes the Institute.

The five scholarships of \$7,500, \$6,000, \$5,000, \$4,000 and \$3,000, and the 35 awards of \$250 each, may be used at any accredited college or university and are intended to assure the professional training of these young pre-scientists. Recognition in the Science Talent Search brings many thousands of dollars in other scholarship offers to the Honors Group. In addition, 37 states and the District of Columbia conduct State Science Talent Searches in cooperation with Science Clubs of America, awarding more than half a million dollars in scholarships to students from their states who were qualified entrants in the national Search.

• Science News Letter, 79:74 February 4, 1961

METEOROLOGY

Weather News Relayed At 850 Words per Minute

► WEATHER INFORMATION relayed at the rate of 850 words per minute is now being transmitted by the Federal Aviation Agency using its new Automatic Data Interchange System (ADIS). Both civil and military aviation are being serviced by this first multi-point, high-speed, teletypewriter network.

Operating eight times as fast as most persons talk, the ADIS will speed the collecting of meteorological observations from about 1,000 stations and advance their distribution to 2,500 points of use, operating 24 hours a day, every day of the year.

• Science News Letter, 79:75 February 4, 1961

SCIENCE BARGAINS

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ADVANCED EUCLIDEAN GEOMETRY: An Elementary Treatise on the Geometry of the Triangle and the Circle—Roger A. Johnson—*Dover*, 319 p., illus., paper, \$1.65. Formerly titled *Modern Geometry*, published in 1929.

ANIMAL SOUNDS AND COMMUNICATION—W. E. Lanyon and W. N. Tavolga, Eds.—*AIBS*, 443 p., illus., 12 inch long playing record, \$9.50. Proceedings of a symposium which combined studies in general animal behavior and investigations in biological acoustics. Accompanying record, edited by P. P. Kellogg, demonstrates sounds of birds, chickens, insects, fishes and frogs.

ANTARCTIC METEOROLOGY: Proceedings of the Symposium Held in Melbourne, February 1959—Australian Bureau of Meteorology—*Pergamon*, 483 p., illus., \$17.50. Collection of facts and ideas available at the conclusion of the IGY.

BIBLICAL ARCHAEOLOGY—M. Du Buit, transl. from French by Kathleen Pond—*Hawthorn Bks*, 110 p., illus., \$3.50. Deals entirely with Palestinian or Syro-Phoenician material, shows how authenticated results of excavations illustrate the life and customs of the ancient people of Israel.

BIONOMICS, SYSTEMATICS, AND PHYLOGENY OF *Lytta*, A GENUS OF BLISTER BEETLES (COLEOPTERA, MELOIDAE)—Richard B. Selander—*Univ. of Ill. Press*, 295 p., illus., \$5.50; paper, \$4.50. Study devoted in its major part to the species of *Lytta* of North America.

BOOLEAN ALGEBRA AND ITS APPLICATIONS—J. Eldon Whitesitt—*Addison-Wesley*, 182 p., illus., \$6.75. For students of mathematics and engineering concerned with computer design, control systems or electronic circuitry.

CARE AND DISEASES OF THE RESEARCH MONKEY—Robert M. Sauer, Ed.—*N.Y. Acad. of Sciences, Annals*, Vol. 85, Art. 3, 257 p., illus., paper \$3.50. Discusses such items as comparison of natural environment with observations in captivity, problems of transportation, care of a large colony, and estimating the age of monkeys.

CHALLENGE OF PHYSICAL RESEARCH—A Primer of Parapsychology—Gardner Murphy with Laura

A. Dale—*Harper*, 297 p., illus., \$6. Purpose of this volume is to give non-specialist a perspective of the nature of the assertions made about paranormal phenomena.

COBALT: Its Chemistry, Metallurgy and Uses—Roland S. Young, Ed.—*Reinhold*, 424 p., illus., \$15. Leading authorities discuss the occurrence, extractive metallurgy, properties and compounds, and the industrial applications of cobalt.

CONTEMPORARY PROBLEMS OF METALLURGY—A. M. Samarin, Ed., transl. from Russian by Bruce Chalmers and Gordon McKay—*Consultants Bur.*, 530 p., illus., \$16. New Russian developments in the metallurgy of iron and steel, nonferrous metals, and the science of metals.

A DICTIONARY OF SCIENTIFIC TERMS: Pronunciation, Derivation and Definition of Terms in Biology, Botany, Zoology, Anatomy, Cytology, Genetics, Embryology, Physiology—L. F. Henderson and W. D. Henderson; 7th ed., by J. H. Kenneth—*Van Nostrand*, 7th ed., 595 p., \$12.50. Deals with more than 15,500 terms, from *abactinal* to *zymotic*.

DISCOVERY AND EXPLORATION: An Atlas-History of Man's Wanderings—Frank Debenham, introd. by Edward Shackleton—*Doubleday*, 272 p., illus., \$9.95. Handsomely illustrated volume, rich in maps, reviews explorations from Stone Age to IGY, features appendices with concise information for reference.

ELEMENTS OF PROJECTIVE GEOMETRY—Luigi Cremona, transl. from Italian by Charles Leudesdorf—*Dover*, 3d ed., 302 p., illus., paper, \$1.75. Comprehensive coverage of the subject, constructed on the basis of Euclidean geometry, with detailed proofs of its fundamental principles.

THE ETRUSCANS IN THE ANCIENT WORLD—Otto-Wilhelm von Vacano, transl. by Sheila Ann Ogilvie—*St. Martins*, 195 p., illus., \$6.50. Authoritative story of the culture of the Etruscans which unfolded and flowered in the great plain of Italy between Rome and Florence from the 8th to the 1st century B.C.

FRACTURE SYSTEMS AND TECTONIC ELEMENTS OF THE COLORADO PLATEAU—Vincent C. Kelley and N. James Clinton—*Univ. of New Mexico Press*, 104 p., maps, 25 plates, \$2.75. An area of 90,000 square miles was mapped from aerial photographs for this study.

HOW TO USE THE ARITHMETIC YOU KNOW—Geoffrey Mott-Smith—*Sterling*, 128 p., \$2.95. Shows how reader can use arithmetic daily to figure ratio and proportion, profit and loss, keep accounts and calculate chances.

INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY, Vol. I, Series II—Harold E. Edgerton and others—*SMPTE*, 187 p., illus., paper, \$4. Papers reprinted from *SMPTE Journal*, on light sources, cameras, cathode-ray tubes, very high-speed systems, and missile photography.

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INTRODUCTION TO SPACE AGE ASTRONOMY—John M. Cavanaugh—*Educ. Services*, 166 p., illus., by author, star map, paper, \$2.75. Popularly explains and illustrates essential features of astronomy without mathematics, with workbook supplement.

INTRODUCTION TO THE STATISTICAL DYNAMICS OF AUTOMATIC CONTROL SYSTEMS—V. V. Solodovnikov, transl. from Russian, John B. Thomas and Lofti A. Zadeh, Eds.—*Dover*, 307 p., paper, \$2.25. Unabridged translation of first comprehensive treatment of the subject published in Russia in 1952.

LINEAR GRAPHS AND ELECTRICAL NETWORKS—Sundaram Seshu and Myril B. Reed—*Addison-Wesley*, 315 p., illus., \$9.75. Provides mathematical foundation for electric network theory by introducing the electrical engineer to the theory of linear graphs, and demonstrating how these methods solve network problems.

A MANUAL OF COMMON BEETLES OF EASTERN NORTH AMERICA—Elizabeth S. Dillon and Lawrence S. Dillon—*Row*, 884 p., illus., \$9.25. A reference work for the professional entomologist, student and amateur collector, emphasizing the most widespread forms in the principal families of the nearly 10,000 species occurring within the area.

MEN OF SCIENCE AND INVENTION—Michael Blow with Robert P. Multhauf—*American Heritage (Golden Press)*, 153 p., illus., \$3.50. Colorful review of American invention, illustrated with many historical pictures.

THE METRIC SYSTEM OF MEASUREMENT—National Bureau of Standards—*GPO*, new ed., 46" x 29" wall chart, paper, 50¢. Graphic presentation and comparisons, including Celsius and Fahrenheit temperature scales.

NATIONAL SCIENCE FOUNDATION: Tenth Annual Report for the Fiscal Year Ended June 30, 1960—Alan T. Waterman, Dir.—*GPO*, 310 p., photographs, paper, \$1. Reports on progress in stimulating the national research effort, promotion of science education, dissemination of scientific information and special international programs.

101 MATHEMATICAL PUZZLES and How to Solve Them—Don Reinfeld and David Rice—*Sterling*, 123 p., illus., \$2.50. Brainteasers requiring only elementary knowledge of algebra and geometry plus an inquiring mind.

PSYCHOLOGY—An Introduction to the Study of Human Behavior—Henry Clay Lindgren and Donn Byrne—*Wiley*, 429 p., illus., \$6.50. Textbook primarily designed to aid students to develop a better and more complete understanding of their own behavior as well as that of others.

QUANTUM MECHANICS—John L. Powell and Bernd Crasemann—*Addison-Wesley*, 495 p., \$9.75. Textbook at senior-graduate level, features detailed explanation of scattering, matrix theory, angular momentum, radiation and perturbation theory.

RUSSIAN FOR SCIENTISTS: A Grammar and Reader—C. R. Buxton and H. Sheldon Jackson—*Interscience*, 299 p., \$5.25. Designed to enable the scientist to acquire a reading knowledge of the Russian language. Includes passages from various scientific sources.

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for Progress—Maurice U. Ames, Arthur O. Baker and Joseph F. Leahy—*Prentice-Hall*, 2nd ed., 416 p., 433 p., 610 p., illus., \$4.95, \$5.15, \$6.55. High school textbooks.

TRANSISTOR CIRCUIT ANALYSIS—Maurice V. Joyce and Kenneth K. Clarke—*Addison-Wesley*, 461 p., \$10.75. Presents basic methods of analysis involved in the design of junction transistor circuitry. A senior-graduate level text and reference volume.

A TREATISE ON THE DIFFERENTIAL GEOMETRY OF CURVES AND SURFACES—Luther Pfahler Eisen-

hart—*Dover*, 474 p., illus., paper, \$2.75. Introductory text for graduate students first published in 1909.

ZOO-MAN STORIES—T. H. Gillespie—*Taplinger*, 121 p., illus. by Len Fullerton, \$2. Talks about animals broadcast in the Children's Hour of the Scottish B.B.C.

ZOO-MAN TALKS—T. H. Gillespie—*Taplinger*, 120 p., illus. by Len Fullerton, \$2. Stories for children.

• Science News Letter, 79:76 February 4, 1961

INVENTION:

Patents of the Week

An exhaust nozzle with curved ridges reduces jet noise. A compact nuclear power plant will produce steam for a turbine producing electricity.

► THE IRRITATING NOISE of a jet engine can be effectively reduced by an invention just patented. This noise, a big problem in the present jet age, is especially irritating when jets take off, releasing a flood of complaints from neighbors living near the airport.

The invention is an exhaust nozzle with a series of curved ridges and grooves along its inner cone. Jet gases passing through the nozzle are broken up into many small air streams that flow along the ridges and grooves. When the streams reach the open air, they mix together, reducing the noise level.

The loss of jet thrust caused by reducing the sound is very small, according to California inventors Kenneth W. Goebel of San Diego, and Lanvin G. Pierce of National City.

The invention also provides a device for slowing down a jet plane just before landing so that it will not need such a long runway.

Two deflectors, attached to the exhaust nozzle, capture the swiftly passing outside air, diverting it into the jet exhaust. This causes a reversal in air flow, producing a braking action.

When the deflectors are used, they form a metal "parachute" that collects the outside air. If they are not needed, they fit snugly over the pod surrounding the engine.

The rights to patent No. 2,968,150 were assigned to Rohr Aircraft Corporation.

A combination jet engine with the advantages of two different types of jet propulsion won patent No. 2,968,146 for Alun Raymond Howell and Charles Ernest Moss, both of Cove, England.

The engine can be converted from a turbo-rocket to a ram-jet propulsion system, depending upon the need of the aircraft. The turbo-rocket system, which is normally used for take-offs, has a bladed compressor that is unnecessary in ram or "pulse" jet engines. When the blades are withdrawn from the path of the incoming air, the engine becomes a pulse jet system capable of very high speeds.

The inventors awarded the patent rights to Power Jets Limited, a British company. Another new patent is a compact nuclear

power plant designed to heat water or heavy water to produce steam for driving a turbine that will produce electricity. The power plant, patent No. 2,968,602, combines advantages of conventional power reactors that require a heat exchanger to produce steam for power and those in which steam is generated in the reactor proper, both of which require extensive shielding of numerous external pipes and auxiliary equipment outside the reactor itself.

The new reactor, invented by Ernest Loeb of Silver Spring, Md., and with patent rights assigned to the Atomic Energy Commission, places the reactor and turbine inside a single housing case, in which the reactor functions as the turbine rotor. The reactor control system requires only one moving part, a valve mechanism which controls the feed water going into the reactor.

Mr. Loeb states that the invention "achieves the nearest approach to the direct conversion of nuclear to mechanical energy presently known."

A push-button method for finding out from a distance whether or not there is mail in the mail box got patent 2,968,804 for Raymond F. Buffington of Manhattan Beach, Calif.

The device essentially is an electric eye that scans the box when a switch is turned on in an apartment or farmhouse. If there is mail, the eye sends back a signal that might be a buzz or a flashing light. No signal means no mail and a fruitless trip to the box is eliminated.

Philip H. Corbett and James Brace of Prairie Village, Kans., have invented a foot-steering apparatus for outboard motor boats. Designed to allow a fisherman to steer the boat by foot while both hands are occupied reeling in the fish, patent No. 2,968,273 consists of a foot pedal that is connected to the lever arm of the motor. The device was assigned to Brace and Corbett, Inc.

For bowling fans, Arno A. Tessman of San Antonio, Texas, has invented a device to help them bowl a better game. The device, awarded patent No. 2,968,101, is a bowling ball with an adjustable grip. By merely adjusting the pressure, the most comfortable holding position is obtained.

• Science News Letter, 79:77 February 4, 1961

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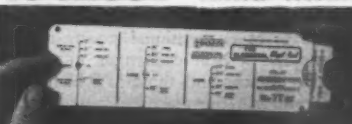
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TECHNOLOGY

Develop Thermoelectric Industrial Generator

► THE FIRST thermoelectric power generator for industrial use has been delivered to the Northern Illinois Gas Company, Aurora, Ill. Designed and built by the Westinghouse Electric Corporation, its electricity will be used to help prevent gas pipelines of the Illinois company from corroding as gas flows through.

In order to produce electric power, propane gas is burnt in the generator, its hot gases passing through an insulated chimney within. Thermoelectric couples, or two different metals joined at their ends, generate electricity as the heated gases pass through them.

• Science News Letter, 79:78 February 4, 1961

Science Quiz Answers

To check yourself on the Quiz page 74, score one point for each correct answer.

PART A: 13-4; 14-2; 15-3; 16-4; 17-1; 26-2; 27-3; 28-2; 29-3; 30-2.

PART B: Section A—31-2; 32-3; 33-2. Section Q—90-4; 91-4.

PART C: 1-1; 2-1; 3-2; 4-2; 5-3; 6-2; 7-3.

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Only 60% of all Ph.D.'s remain in academic life today, compared with 80% in 1900.

A shelter made of plastic foam may be the first home for astronauts when they land on another planet.

The world's most powerful radio station, designed to communicate with Polaris submarines even when they are underwater, is nearly completed in Cutler, Maine.

Twenty-two million women are now working in the United States.

A jet-powered wingless aircraft that can also be used as a road vehicle is now being designed.

• Science News Letter, 79:78 February 4, 1961

Questions

ASTRONOMY—What are the unusual properties of the first known radio star? p. 67.

GENERAL SCIENCE—How many of the top 40 Science Talent Search winners are girls and how many boys? p. 71.

Photographs: Cover, Boeing Airplane Company; p. 57, Minneapolis-Honeywell; p. 69, B. J. Skinner and the American Psychological Association through The Institute of Radio Engineers; p. 71, Shell Oil Company; p. 80, Consolidated Metal Products, Inc.

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• **PLASTIC AIR SPRAY** protects surfaces against rust, moisture and corrosion. The flexible vinyl plastic is resistant to temperature extremes. The clear, transparent coating adds years to the life of marine accessories, auto bumpers and other chrome parts, farm and garden tools. Aluminum screens, storm doors, outdoor furniture are protected against pitting and discoloration.

• Science News Letter, 79:80 February 4, 1961

• **PILL BOX** can be set to sound an alarm to remind pill-takers to take medicine on schedule. The Swiss-made timing device and pill container weighs only one ounce, is as small as a silver dollar in diameter and about $\frac{3}{4}$ inch thick. It comes in six colors with owner's initial or a good-luck charm in center.

• Science News Letter, 79:80 February 4, 1961

• **WHEELED CARRIER**, all-welded steel frame on rubber tires, becomes a snow plow, shown in the photograph, by fastening "snow-wings" to steel arms. It clears a 21-



inch swath of snow with minimum effort. It can also be converted to haul garbage cans and other large objects.

• Science News Letter, 79:80 February 4, 1961

• **MOUSE CAGE** that with disposable bottom saves commercial and private breeders of mice time, energy and money expended in washing, sterilizing and maintaining other types of cages. The easily-stacked bottoms are of tough plastic and

can be incinerated. One thousand cages occupy only 10 cubic feet of space, a saving of almost 90% in space required for metal cages.

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• **CRYSTAL-GROWING KIT** for hobbyists interested in the icicle-like formations that appear and grow in chemicals includes directions and a generous supply of chemicals required. It makes possible the study of factors affecting the growth and behavior of crystals.

• Science News Letter, 79:80 February 4, 1961

• **CHARCOAL SNUFFER** designed to snuff briquets left over from a barbecue reduces charcoal consumption. The snuffed briquets start easier and faster than new briquets. The aluminum-copper-silicon alloy container makes possible many more barbecues from a 10-pound bag of charcoal than usually obtained.

• Science News Letter, 79:80 February 4, 1961

• **ALUMINUM ART CANVAS** has the textured surface of canvas and linen but is more durable and easier to paint on. The metal canvas will take oil, casein, water color or air brush and will not chip, crack or buckle. Available in standard canvas sizes as well as larger sizes, the new art product is light in weight and easy to store.

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Nature Ramblings



► **WHETHER OR NOT** the rodent supposedly endowed with weather predicting ability is called a marmot or a woodchuck on other days of the year, his name is Groundhog on Feb. 2.

There is some difference of opinion as to when and where this myth began. It may have existed in Europe as long ago as pre-Christian times when the hedgehog, a porcupine-like animal, was the weather prophet of the day. Later it may have been the badger that saw his shadow on Candlemas Day.

Some say early colonists brought the legend to the New World, and finding no European hedgehogs or badgers thrust the burdensome job on the groundhog, a relative of rabbits, squirrels and guinea pigs. Others say the belief originated with Negroes of the eastern middle states who observed that in mild winters the groundhog may appear in February but will go underground again as soon as cold weather returns.

Weather Predictor?



Most groundhogs, however, do not begin spring activity until late March or early April. Studies have shown that the hibernating chamber, a nest at the end of a narrow shaft extending four or five feet down and 20 feet long, is coldest during these first few weeks of early spring.

When the groundhog finally emerges in the spring, it has a battered appearance and weighs only slightly more than five pounds, about half as much as when it went into hibernation in the fall. The

animal is hungry, of course, but finding a mate usually is the most important job for the moment. With much whistling and squeaking and an occasional barking sound, mating is achieved.

A month later, two to eight naked, blind, helpless young are born. Their eyes open and the coat develops within a month and they are weaned at five weeks.

In the meantime, adults begin their hunt for food, mostly plants such as alfalfa and clover, but frequently snails, insects, mice or even birds.

By midsummer the nursery has become overcrowded and the mother groundhog chases a few or all of the young from the nest to find or build their own burrows.

Unlike the notorious prairie dogs, who join their underground tunnels to build prairie dog towns, groundhogs are not particularly gregarious. In the fall, each groundhog, then fat and sleepy, will retreat to his own den.

—GLORIA BAIL

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